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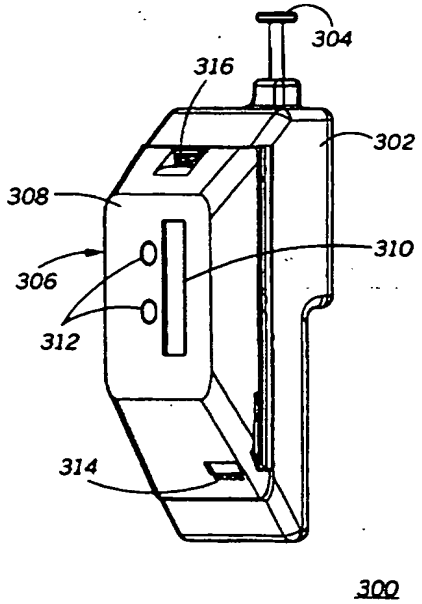
(57) Abstract

A selective call receiver (710) having a receiver (714) for receiving paging messages; a decoder (716), coupled to the receiver (714), for decoding the paging messages, and a housing (308) having a battery (306) for a cellular telephone (702). The battery (306) includes a power supply (704) for providing power to both the selective call receiver (710) and the cellular telephone (702). A display (310) is positioned on and integrally coupled to an outer surface (308) of the battery (306) for displaying the paging messages.



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SELECTIVE CALL RECEIVER IN A BATTERY OF A TWO-WAY COMMUNICATION DEVICE

This is a Continuation-In-Part application of prior application Serial No. 08/383,333 filed on February 3, 1995 by Barnett et al. for "CELLULAR TELEPHONE BATTERY HAVING A SELECTIVE CALL RECEIVER" **and** prior application Serial No. 08/381,053 filed on January 31, 1995 by Malone, et al. for "DISPLAY MODULE FOR USE WITH A TWO-WAY COMMUNICATION DEVICE.

Field of the Invention

This invention relates in general to selective call receivers, and more particularly to a selective call receiver in a battery of a two-way communication device.

Background of the Invention

The advent of cellular telephone heralds a new phase of two-way portable communication. However, while cellular telephone provides portable two-way communication, it brings a high economic cost for the convenience of being accessible in most geographic locations. Furthermore, because the user of the cellular telephone has to pay the air time cost for all call to and from her cellular telephone, there is no way to prevent indiscriminate calls apart from restricting the disclosure of your cellular telephone number or turning off your telephone which causes important calls to be missed.

One attempt to solve this problem was to combine a cellular telephone with a selective call receiver (pager). With the combined cellular telephone-selective call receiver, the user may widely distribute the number for her selective call receiver while restricting the number to her cellular telephone. When paged, the user can then determine, from the telephone number or any accompanying messages, whether to call back on her cellular telephone. With the combination, the cellular telephone and the selective call receiver have separate receiving circuits so both devices may operate, i.e., receive messages independent of each other or even simultaneously. Unfortunately, conventional cellular telephone has a limited power supply and under normal operating conditions is unable to provide a "talk-time" long enough for most users. The limited

power supply of the battery is exacerbated when the cellular telephone is combined with the selective call receiver because both devices place a higher demand for power on the battery which already has an inadequately short "talk-time."

Prior display devices in two-way communication devices have been integral to the communication device. These display apparatus typically provide a relatively small display screen that severely limits the amount of information that is displayed at any given time. Such display limitations restrict the amount of data that can be effectively transmitted to the user at any one time. These displays require an extensive use of scrolling and are typically quite small in size. A typical display for a cellular telephone would only be capable of showing one or two lines of information, where each line is typically limited to less than ten alphanumeric characters. While this size display may be adequate for displaying a telephone number, it is inadequate for displaying a multi-word, multi-line message. The current state of the art to display a multi-line message is for the user to scroll (sometimes called "banking") through the message one or two words at a time. This requires the user to input many keystrokes (scrolling procedure) to the device in order to read the entire message or messages. Unless the message is "short" or encrypted, the user cannot see the total message without the use of scrolling. If the user has multiple messages, the task is even more time consuming since additional keystrokes are required.

Also, even to inform the user of a simple thing such as a "low battery", the display typically resorts to the use of icons to indicate the status of the battery in order to communicate this additional information on these small displays. Since there is no standardization of icons between phone manufacturers, the user is required to remember and recognize a different set of symbols for each cellular telephone that he uses. It would be more universally understood if the phone simply displayed the message "low battery" instead of requiring the user to recognize some "non-standard" icon.

When it desired to read a text message on one of these existing displays for a cellular telephone, the user is forced to typically read one or two words of the message and then scroll to the next words in the message. Since many existing cellular telephones were optimized for use with numbers and not text, they do not have a scroll key. The user is

forced to remember some special function key such as "*" or "#" in order to implement the scroll function. Sometimes the scroll feature is associated with function keys such as the volume "up" and volume "down" keys.

Since the current input on most cellular telephones still have a full telephone keypad, there is little room remaining for the designer of the cellular telephones to include a larger display within the existing form factor of the cellular telephone. This form factor is likely to continue as the general public is extremely familiar with the telephone keypad. However, the actual size of the telephone circuitry is likely to become even smaller. Some cellular products have overcome this size limitation by making the front of the cellular telephone a display where the keypad appears on the display to create a virtual keypad. However, this feature eliminates the look and feel of the telephone keypad that consumers are very comfortable with and like.

Therefore, what is needed is an method and an apparatus to prevent unnecessary calls to a cellular telephone without increasing the chance of missing important calls or deteriorating the battery life of the cellular telephone. It would be desirable to provide a display device, which is modular, so as to be adaptable for removable attachment to existing cellular telephones to allow a user to read, with minimal keystrokes and scrolling, an entire message. It would be further desirable to provide such a modular device that shares a battery with the cellular telephone.

Brief Description of the Drawings

FIGS. 1-2 are perspective views of two types of batteries for a cellular telephone according to the prior art.

FIG. 3 is a perspective view of a cellular telephone with a battery having a selective call receiver in accordance with a preferred embodiment of the present invention.

FIG. 4 is a perspective view of the battery disconnected from the cellular telephone according to FIG. 3.

FIG. 5 is a perspective view of the battery including a selective call receiver disconnected from the cellular telephone in accordance with a second embodiment of the present invention.

FIG. 6 is a perspective view of the battery including a selective call receiver disconnected from the cellular telephone in accordance with a third embodiment of the present invention.

FIG. 7 is an electrical block diagram of the cellular telephone and the selective call receiver coupled to the battery in accordance with the preferred embodiment of the present invention.

FIG. 8 is a perspective view of a detachable module in accordance with the a fourth embodiment of the present invention attached to a cellular telephone.

FIG. 9 is an exploded view of FIG. 8.

FIG. 10 is a reverse view of FIG. 9.

FIG. 11 is an exploded plan view of FIG. 8.

FIG. 12 is a plan view of FIG. 8;

Description of a Preferred Embodiment

FIGS. 1 and 2 show two perspective views of prior art batteries, for example, the Motorola MICROTAC™ cellular telephone. The battery illustrated in FIG. 1 shows a battery size having a shorter "talk-time," and the battery illustrated in FIG. 2 shows a battery size having a longer "talk-time". As is well known, the cellular telephone can be attached to either batteries shown in FIGS. 1 and 2 by slidably coupling and decoupling the battery to and from the rear of the cellular telephone.

Referring to FIG. 3, the cellular telephone is shown which has a battery comprising a selective call receiver in accordance with a preferred embodiment of the present invention. The combination cellular telephone 300 has a housing 302 and a retractable antenna 304 for receiving and transmitting communication to and from the cellular telephone 300. The battery 306 is mechanically and electrically coupled to the housing 302 for providing power to the cellular telephone. An outer surface (or housing) 308 of the battery 306 similarly forms (or comprises) the housing for the selective call receiver enclosed within the battery 306. A power supply (or power source) enclosed within the housing 308 of the battery 306 provides power to the cellular telephone 300 including the selective call receiver enclosed within the battery 306. Without increasing the external sizes of the batteries shown in FIGS. 1 and 2, the power supply of FIG. 1, for example, can be used in the housing of FIG. 2

to provide sufficient space to incorporate the selective call receiver in the same size battery as FIG. 2. A display 310 is positioned on and integrally coupled to the housing 308 of the battery 306 for displaying messages received by the selective call receiver or the cellular telephone to be discussed in details below. Control buttons 312, coupled to the housing 308 of the battery 306, enable the user to control the selective call receiver and to manipulate the messages received by the selective call receiver by storing, retrieving and discarding the messages. The battery 306 further comprises connections 314 for coupling the battery 306 to an external charger (not shown). A release button 316 is provided on the battery 306 for unlocking the battery 306 from the housing 302 of the cellular telephone to permit the battery 306 to be decoupled and disconnected from the cellular telephone.

FIG. 4 illustrates a perspective view of the battery decoupled and disconnected from the cellular telephone according to FIG. 3. The battery 306 comprises a mechanical interface 402 having alternate sets of interlocking rails and an electrical interface composed of pressure contacts for coupling and connecting the cellular telephone to the battery 306. When the battery 306 is coupled and connected to the cellular telephone, the cellular telephone operates independent of the selective call receiver. Therefore, the cellular telephone can be in use while the selective call receiver is receiving a page (selective call message). Furthermore, even when the cellular telephone is turned-off, the selective call receiver is still capable of receiving selective call messages.

As illustrated in FIG. 4, the battery 306 can be disconnected from the cellular telephone thereby disabling the cellular telephone while keeping the selective call receiver fully capable of receiving selective call messages. In this way, the battery 306 of the cellular telephone when disconnected operates as an independent selective call receiver which is powered by the power supply of the cellular telephone battery 306. The housing 308 of the battery forms the housing enclosure 308 for the selective call receiver.

Referring to FIG. 5, a perspective view of the battery disconnected from the cellular telephone including the selective call receiver is shown in accordance with a second embodiment of the present invention. The battery 500 according to the second embodiment comprises a battery door

502 which provides access to a secondary battery 726 (FIG. 7) for providing back-up power for the selective call receiver.

Referring to FIG. 6, a perspective view of the battery disconnected from the cellular telephone having the selective call receiver is shown in accordance with a third embodiment of the present invention. The battery 600 is shown with a belt clip 602 coupled to the mechanical interface 402 of housing enclosure 308 of the battery. The belt clip 602 comprises a mechanical interface 604 similar to the mechanical interface 402 of the battery 306 but is capable of mating thereto for attaching the belt clip 602 to the housing 308 of the battery. The mechanical interface 604 comprises a slidable coupling that enables the belt clip 602 to be slidably coupled to the battery via the mechanical interface 402 of the battery which similarly has a slidable coupling. Operationally, the belt clip is attached to the battery by sliding on as shown by the arrow 606. The battery 308 provides power to the selective call receiver contained within the housing 308 to enable the selective call receiver to function while the battery is disconnected from the selective call receiver. Therefore, the battery 306 when disconnected from the cellular telephone can be carried as a separate and independent unit from the cellular telephone.

In this way, the battery of the cellular telephone including the selective call receiver can be disconnected and carried separately from the cellular telephone. The selective call receiver can function even when the cellular telephone is turned-off. This ensures that the user can determine when to respond to a page depending on the priority the user attaches to the message received on the selective call receiver. Additionally, when a user determines that the probability of having her cellular telephone stolen is high, she can disconnect the cellular telephone from the battery. The cellular telephone can then be left in a secure place while the battery can be connected to the belt clip 602 and carried as a selective call receiver enabling the user to still be in constant communication without compromising the safety of her cellular telephone.

Referring to FIG. 7, an electrical block diagram of the selective call receiver coupled to a battery and the cellular telephone is shown in accordance with the present invention. The cellular telephone 702 comprises a two-way communication circuitry 702 and a mechanical interface (discussed above) for coupling to the battery 704 of the cellular

telephone (or portable device). The battery (power supply) 704 preferable comprises a size capable of fitting in the battery shown in FIG. 1 to provide sufficient space to incorporate the selective call receiver and any additional circuitry. The battery housing, as discussed above, has a similar mechanical interface which enables the battery to be mechanically and electrically coupled to the cellular telephone 702. As is well known, the battery 704 for the cellular telephone 702 is capable of providing six (6) volts to power the cellular telephone 702 and a typical battery for a selective call receiver is capable of providing one-and-one-half (1.5) volts. Therefore, a regulator 706 coupled between the cellular telephone 702 and the selective call receiver regulates (a voltage) the six volts supply from the battery 704 down to one-and-one-half volts supply for providing power to the selective call receiver 710. Alternatively, because the battery 704 comprises a plurality of cells, the desired one-and-one-half volts can be obtained by coupled to the required number of cells of the plurality of cells to obtain the required voltage. The selective call receiver 710, the battery 704 and the regulator 706 are coupled together 708 in the battery housing.

The two-way communication circuitry of the cellular telephone 702, when coupled to the battery 704, can initiate and receive telephone call via the antenna 304. The selective call receiver 710 is connected to outputs from the regulator 706 which provides the required one-and-one-half voltage supply to the selective call receiver 710. The selective call receiver 710 comprises an antenna 712 coupled to a receiver 714 for receiving messages addressed to the selective call receiver 710. A decoder/controller 716 decodes the received messages and processes the decoded message which is stored in a memory 720. Upon the receipt of the message, an alert 718 alerts the user of the received message which can be stored in the memory 720 or displayed on the display 722. Optionally, the selective call receiver is coupled to a secondary battery 726, for example a "AAA" battery, by techniques well known to one skilled in the art, to produce one-and-one-half volts for powering the selective call receiver 710. An optional switch 724 that automatically or manually disconnects and connects the selective call receiver to the secondary battery 726. Therefore, when the battery 704 is discharged below one-and-one-half volts, the secondary (back-up) battery 726 provides a back-up power supply to the selective call receiver. The

selective call receiver alternatively can be attached in the battery as a plug-in module illustrated by plug-in connectors 730, 732 well known to one skilled in the art to enable the selective call receiver circuitry to be removed and replaced when said battery is being recharged.

As shown, the cellular telephone 702 and the selective call receiver 710 can be used simultaneously and independently of each other because both devices operate independently of each other since the cellular telephone 702 and the selective call receiver 710 share the battery 704.

The cellular telephone generally has a coverage area that is more limited than a selective call receiver, and the per minute charges of a cellular telephone are more expensive when compared with the monthly charges for a selective call receiver. Therefore, by including a selective call receiver in the battery of a cellular telephone, when the battery is discharged below a voltage level (level) for operating the cellular telephone, the battery can be disconnected from the cellular telephone and be carried as an independent unit capable of receiving pages. In this way, when the battery is discharged below the required the voltage level to operate the cellular telephone, the battery can be disconnected from the cellular telephone and still operate independently as a selective call receiver. Furthermore, when the cellular telephone is disconnected, the current drain on the battery is reduced thereby increasing the battery life for the selective call receiver. Accordingly, the selective call receiver enclosed in the battery of the cellular telephone will have an extended battery life because the cellular battery is a six volt battery and the selective call receiver only requires 1.5 volts. Therefore, when the cellular telephone has discharged the battery below the voltage level of operation, the selective call receiver requiring one-and-one-half volts will still be able to operate for a long period of time.

Accordingly, the cellular telephone can be carried in its off-position to prevent indiscriminate calls because the selective call receiver is able to receive pages while the cellular telephone is off. Therefore, the user can then determine from the number or the message which calls to return. Furthermore, this combination cellular/selective call receiver provides a latent safety measure for the cellular telephone because when the battery is discharged below the voltage level to operate the cellular telephone, the cellular telephone can be disconnected from the battery

and be left in a secure place while the belt-clip is attached to the battery for securing the cellular battery/selective call receiver to the user.

In summary, a battery for powering a cellular telephone comprises a selective call receiver, a regulator coupled to the selective call receiver for regulating a voltage of the battery for powering the selective call receiver, and a slidable coupling slidably decouples the battery from the cellular telephone. The battery also provides power to the selective call receiver when decoupled from the cellular telephone. A belt clip couples to the battery to enable the selective call receiver to be carried independent of the cellular telephone, and a secondary battery (back-up battery), enclosed within the battery, provides a back-up power supply for the selective call receiver. A housing of the battery also encloses the selective call receiver within the battery. The housing further comprises a display coupled to an outer surface for displaying messages received by the selective call receiver or the cellular telephone.

A detachable module for use with a two-way communication device comprising a display screen for displaying information received or transmitted by the two-way communication device, an electrical connector operably attached to the display screen and adapted for electrical connection to a two-way communication device and the detachable module are adapted for removable attachment to the two-way communication device.

Referring to FIG. 8, a detachable module 10 is shown preferably comprising a selective call receiver for use with a two-way communication device 12. The detachable module 10 preferably includes a selective call receiver as described in reference to FIG. 7. The detachable module 10 alternatively includes a display screen 14 for displaying information received or transmitted by the two-way communication device 12 and the selective call receiver. The two-way communication device 12 is preferably a cellular telephone, as shown. However, device 12 could be another type of two-way communication device such as modem for land line telephone circuitry, a cellular modem, a cordless telephone, a specialized mobile radio (SMR), a personal communication system (PCS) device, or a personal digital assistant (PDA).

The detachable module 10 preferably also includes electrical interfaces 16 and 18 for operably attaching additional equipment (not shown) to the detachable module 10, thereby enhancing the capabilities

of the detachable module 10 and communication device 12. The electrical interfaces 16 and 18 are preferably the RS-232 interface and infrared interface shown but could be any other interface or connection necessary to enable the desired additional equipment, such as a duplicate of the connector 30 shown in FIG. 9. The additional equipment (remote entity) could include such devices as printers, fax machines, PDAs, personal computers, or other equipment for transmitting, receiving, or manipulating data through the communication device 12. A standard connection 20 for charging an energy source module or battery 22 is also provided. Control buttons 24 include the power button for the selective call receiver and provide such other features as scrolling or menu options for the display the received paging messages or two-way messages. The buttons 24 may be as shown or provided on the display as touch pads on the screen 14 or implemented as virtual buttons on the display 14.

As can best be seen in FIG. 9, the detachable module 10 includes a body portion 26 and tail section 28. The tail section 28 is configured so that it extends beyond energy source (battery) 22 to allow for attachment to communication device 12 through externally accessible electrical connector 30. Those skilled in the art will appreciate that the physical configuration of detachable module 10 depends on the physical configuration of energy source 22 and communication device 12, as well as the location of electrical connector 30. This module configuration provides the advantage of allowing the detachable module to be easily attached to other compatible energy sources 22 and communication devices 12.

In addition, the detachable module 10 including the selective call receiver and communication device 12 are preferably powered by same energy source 22 via connection 32, which contacts connections 20 and 34. By powering detachable module 10 through the external connection 32 the energy source 22 can be used more effectively to power both the detachable module 10 having the selective call receiver and the communication device 12. Energy source 22 can be adapted to be removably attached to both the detachable module 10 and the communication device 12; or the detachable module 10 can simply be attached directly to communication device 12 (not shown).

Referring to FIGs. 10 and 11, there is shown an electrical connector 36 operably attached to the detachable module 10 and adapted for electrical connection to the communication device 12 via electrical connector 30. Connectors 30 and 36 provide the electrical interface between the detachable module 10 and communication device 12 as well as enhancing attachment of the module 10 to the device 12.

FIG. 12 is a side elevation view showing the detachable module 10, the energy source 22, and the communication device 12 interconnected to one another. It can be seen from FIG. 12 that the detachable module 10 provides a compact, streamlined design enabling the detachable module 10 to be attached to communication device 12 so that the detachable module having the selective call receiver takes up a minimum amount of space while maximizing the display screen 14 size to the form factor of the communication device 12.

In addition to the text shown on the display screen 14 in FIG. 8, the screen 14 can display information in the form of text, graphics, or icons. A partial list of possible applications provided by detachable module 10 includes: send and end functions, back lighting, incoming message or call indicator, voice mail, caller ID., memory full indicator, voice and ringer volume adjustments, last number redial, battery meter, signal strength indicator, phone locked/unlocked indicator, no service indicator, in-use indicator, roam indicator, home or non-home type system, non-standard programmed options indicator, system busy indicator, system registration, customer service number, time/date functions, lock message function, and a display of the phone number or multiple phone numbers of the communication device 12. Thus, by attaching the detachable module 10 to an existing two-way communication device 12 the usefulness and the services provided to a user can be greatly enhanced.

The detachable module 10 establishes electrical connection at the connector 36 to the cellular telephone 12. It attaches to a standard or a modified battery pack 22 that is compatible with the cellular telephone 12. Obviously, the cellular phone 12 may be used in the standard configuration without the detachable module 10 for operation as strictly a cellular telephone.

As described above, the detachable module 10 may be powered through the connection 32 of the battery 22. This allows the battery 22 to

provide power to both the cellular telephone 12 and the detachable module 10 having the selective call receiver concurrently.

By establishing a proper electrical connection to the communication device 12, the detachable module 10 has access to all of the features supported by the device 12 or could operate independently as a the display for the selective call receiver within the detachable module. This allows enhanced operation, as any of the features of the cellular telephone, that normally would not be utilized due to the small size of the display can be made available to the user. In addition, devices that communicate with the cellular telephone 12 can make use of the larger display screen 14 to indicate device status and other information that the user may require. This larger display 14 also allows cellular telephone diagnostic messages to be displayed without having to attach another device to the cellular telephone 12 in order to read the messages.

As can be seen, a specific embodiment of the present invention has been shown and described. Further modifications and improvements will occur to those skilled in the art. Such modifications may include providing additional electrical interfaces or different types of buttons to control the detachable module 10.

What is claimed is:

CLAIMS

1. A selective call receiver, comprising:
a receiver for receiving paging messages;
a decoder, coupled to the receiver, for decoding the paging messages;
a housing comprising a battery for a cellular telephone wherein said battery including a power supply for providing power to both the selective call receiver and the cellular telephone; and
a display, positioned on and integrally coupled to an outer surface of said battery, for displaying the paging messages.

2. The selective call receiver according to claim 1 further comprising a belt clip wherein said belt clip couples with the battery when the battery is disconnected from the cellular telephone for enabling the selective call receiver to be carried independent of the cellular telephone.

3. The selective call receiver according to claim 1 wherein the battery further comprising a regulator regulating a voltage of the battery for powering the selective call receiver, the voltage regulated by the regulator is sufficient for powering the selective call receiver when the battery is discharged below a voltage level capable for powering the cellular telephone.

4. The selective call receiver according to claim 1 further comprising a secondary battery coupled as a back-up battery for providing power to the selective call receiver.

5. A battery for powering a cellular telephone, comprising:
a selective call receiver;
a regulator coupled to the selective call receiver for regulating a voltage of the battery for powering the selective call receiver;
a coupling for slidably decoupling the battery from the cellular telephone wherein the battery is capable of providing power to the selective call receiver when decoupled from the cellular telephone; and
a housing for enclosing the selective call receiver within the battery, the housing further comprising a display coupled to an outer surface for displaying messages received by the selective call receiver.

6. The battery according to claim 5 further comprising a belt clip coupled with said battery when decoupled from the cellular telephone.

7. The battery according to claim 5 wherein said regulator provides a voltage sufficient for powering the selective call receiver when the battery is discharged below a level for powering the cellular telephone.

8. The battery according to claim 5 wherein the selective call receiver is capable of being removed from said battery when said battery is being recharged.

9. The battery according to claim 8 wherein the selective call receiver further comprises a secondary battery for powering said selective call receiver when the selective call receiver is removed from the battery while the battery is being recharged.

10. A selective call receiver, comprising:

a receiver for receiving paging messages;

a decoder, coupled to the receiver, for decoding the paging messages;

a housing comprising a battery for a cellular telephone wherein said battery including a power supply for providing power to both the selective call receiver and the cellular telephone;

a belt clip for coupling to the housing to enable the selective call receiver to be carried independent of the cellular telephone;

a regulator, coupled to the battery, for regulating a voltage of the battery for powering the selective call receiver;

a secondary battery for providing a back-up power supply for the selective call receiver; and

a display, positioned on and integrally coupled to an outer surface of the battery, for displaying the paging messages.

11. A battery for powering a cellular telephone, comprising:

a selective call receiver;

a regulator coupled to the selective call receiver for regulating a voltage of the battery for powering the selective call receiver;

a slidable coupling for slidably decoupling the battery from the cellular telephone wherein the battery is capable of providing power to the selective call receiver when decoupled from the cellular telephone;

a belt clip for coupling to the battery to enabling the selective call receiver to be carried independent of the cellular telephone;

a secondary battery, enclosed within the battery, for providing a back-up power supply to the selective call receiver; and

a housing for enclosing the selective call receiver within the battery, the housing further comprising a display coupled to an outer surface for displaying messages received by the selective call receiver.

12. A detachable module for use with a two-way communication device comprising:

a display screen for displaying at least one of information received and transmitted by the two-way communication device;

an electrical connector operably attached to the display screen and adapted for electrical connection to a two-way communication device; and

wherein the detachable module is adapted for removable attachment to the two-way communication device.

13. The detachable module of claim 12, further including an energy source module removably attachable to the detachable module and adapted for removable attachment to the two-way communication device thereby supplying power to both the detachable module and the two-way communication device.

14. The detachable module of claim 12, further including an electrical interface for operably attaching additional equipment to the detachable module.

15. The detachable module of claim 14, wherein the electrical interface is an RS-232 interface.

16. The detachable module of claim 14, wherein the electrical interface is an infrared interface.

17. The detachable module of claim 12, further comprising a selective call receiver for receiving selective call messages.

18. A two-way communication device comprising:

two-way communication circuitry for communicating information between a remote entity and the two-way communication device;

an energy source operably attached to the two-way communication circuitry for providing power to the two-way communication circuitry;

an externally accessible electrical connector operably connected to the two-way communication circuitry for at least transmitting data to and from the two-way communication circuitry; and

a module operably connected to the two-way communication via the externally accessible electrical connector and adapted for removable attachment to the two-way communication device, the module comprising a selective call receiver having a receiver and a decoder being powered by the energy source.

19. The two-way communication device of claim 18 wherein the energy source is an energy source module removably attachable to the module and adapted for removable attachment to the two-way communication device for supplying power to both the detachable module and the two-way communication device.

20. A cellular telephone, comprising:

a two-way communication circuitry for providing two-way communication;

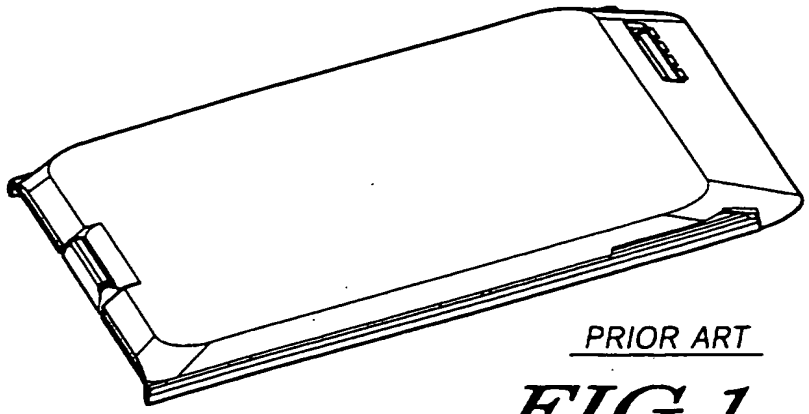
an energy source module removably attachable to the two-way communication circuitry and adapted for removable attachment to the cellular telephone for supplying power thereto

a module operably connected to the energy source via an electrical connector and adapted for removable attachment to the cellular telephone, the module comprising a selective call receiver, the selective call receiver comprising:

a receiver for receiving paging messages; and

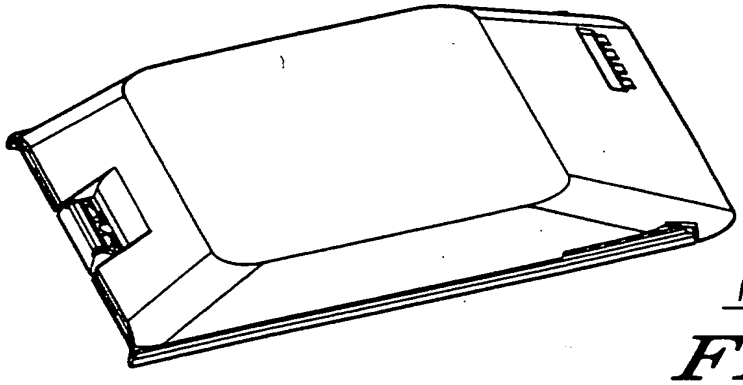
a decoder, coupled to the receiver, for decoding the paging messages; and

a display for displaying the paging messages.



PRIOR ART

FIG.1



PRIOR ART

FIG.2

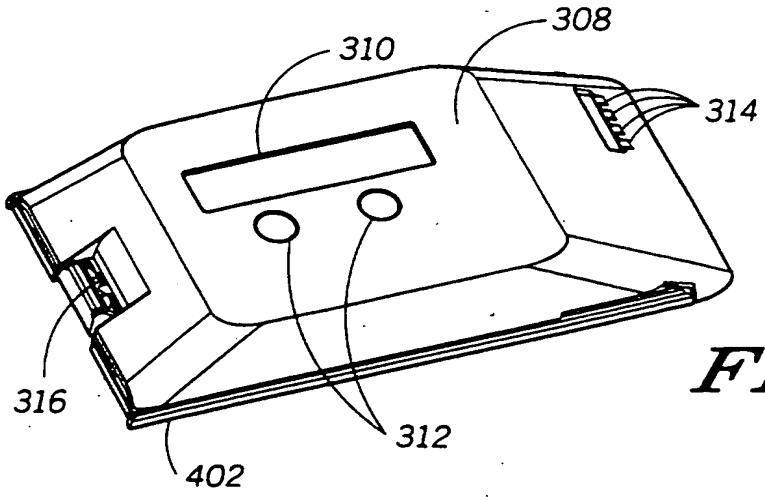


FIG.4

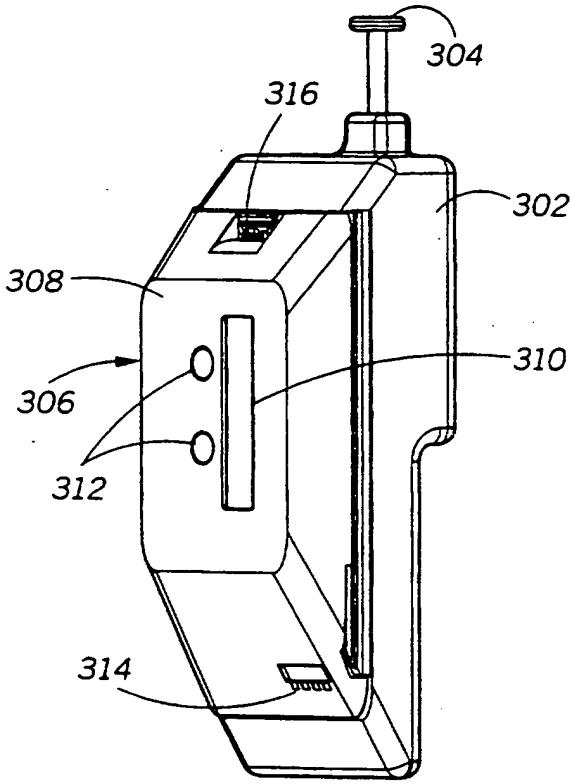


FIG.3

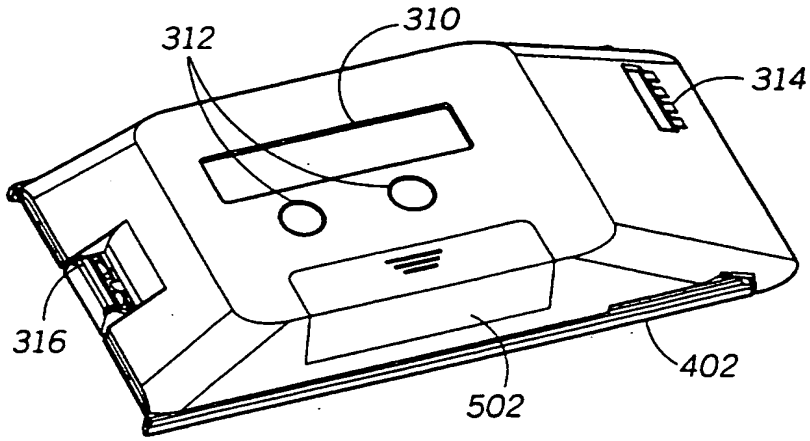


FIG.5

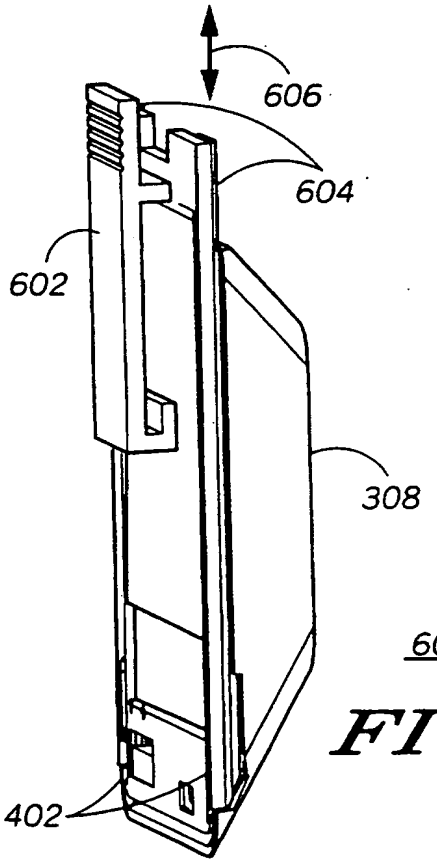


FIG.6

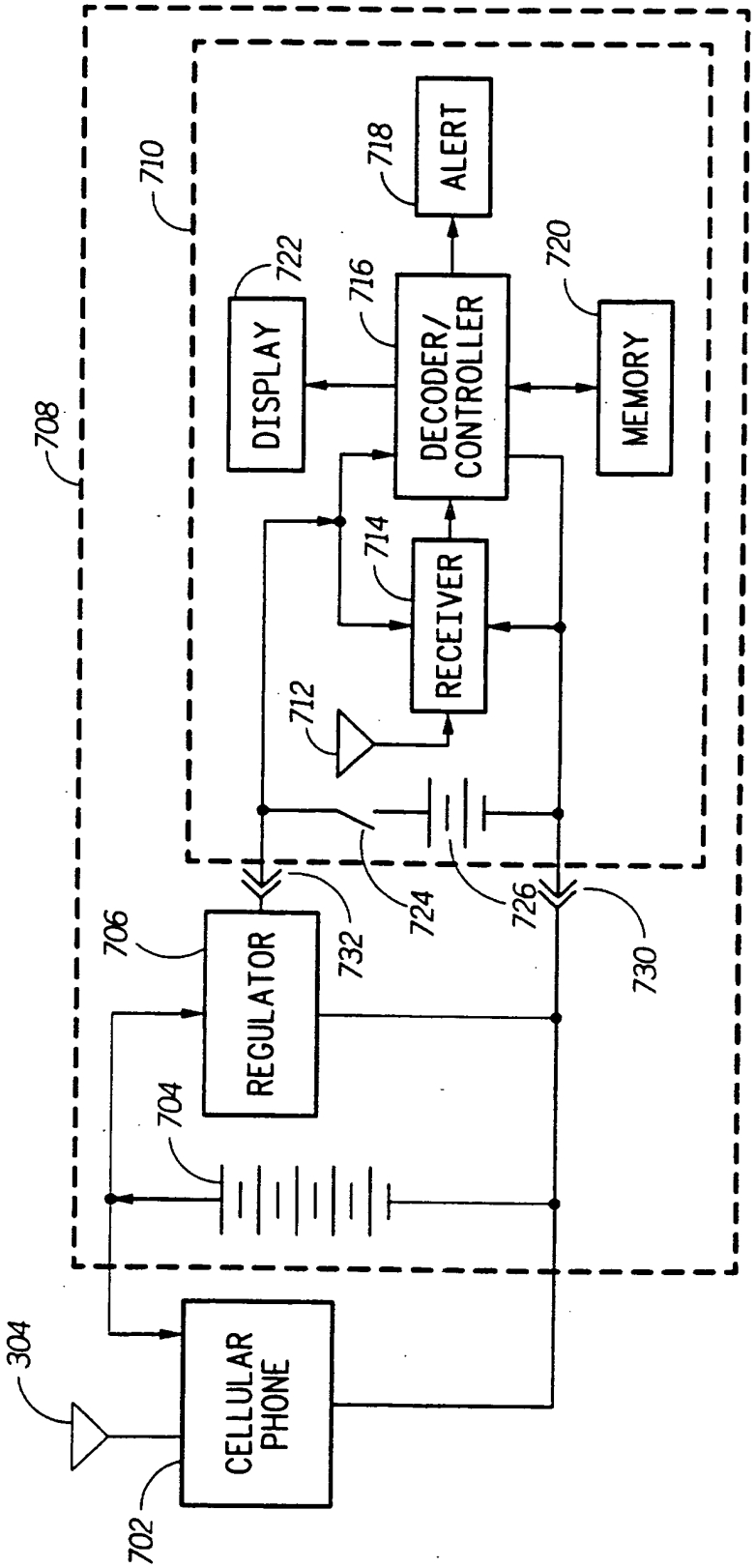

CELLULAR PHONE
REGULATOR
RECEIVER
DECODER/ CONTROLLER
DISPLAY
ALERT
MEMORY
702
304
704
706
708
710
712
714
716
718
720
722
724
726
730
732

FIG. 7

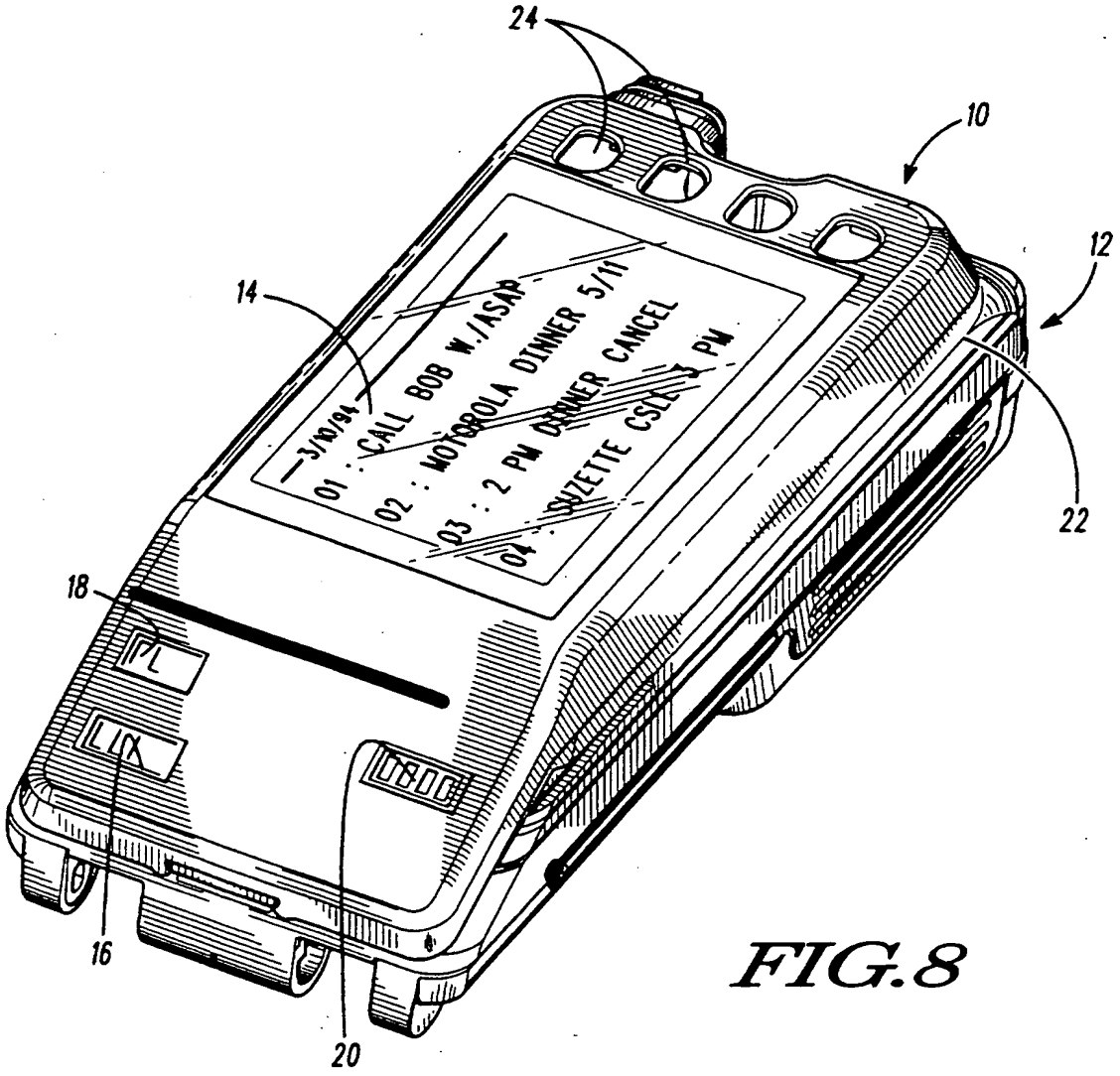

24
10
12
14
3/10/94
01 : CALL BOB W./ASAP
02 : MOTOROLA DINNER 5/11
03 : 2 PM DENVER CANCEL
04 : SUZETTE CSL 3 PM
22
18
16
20

FIG.8

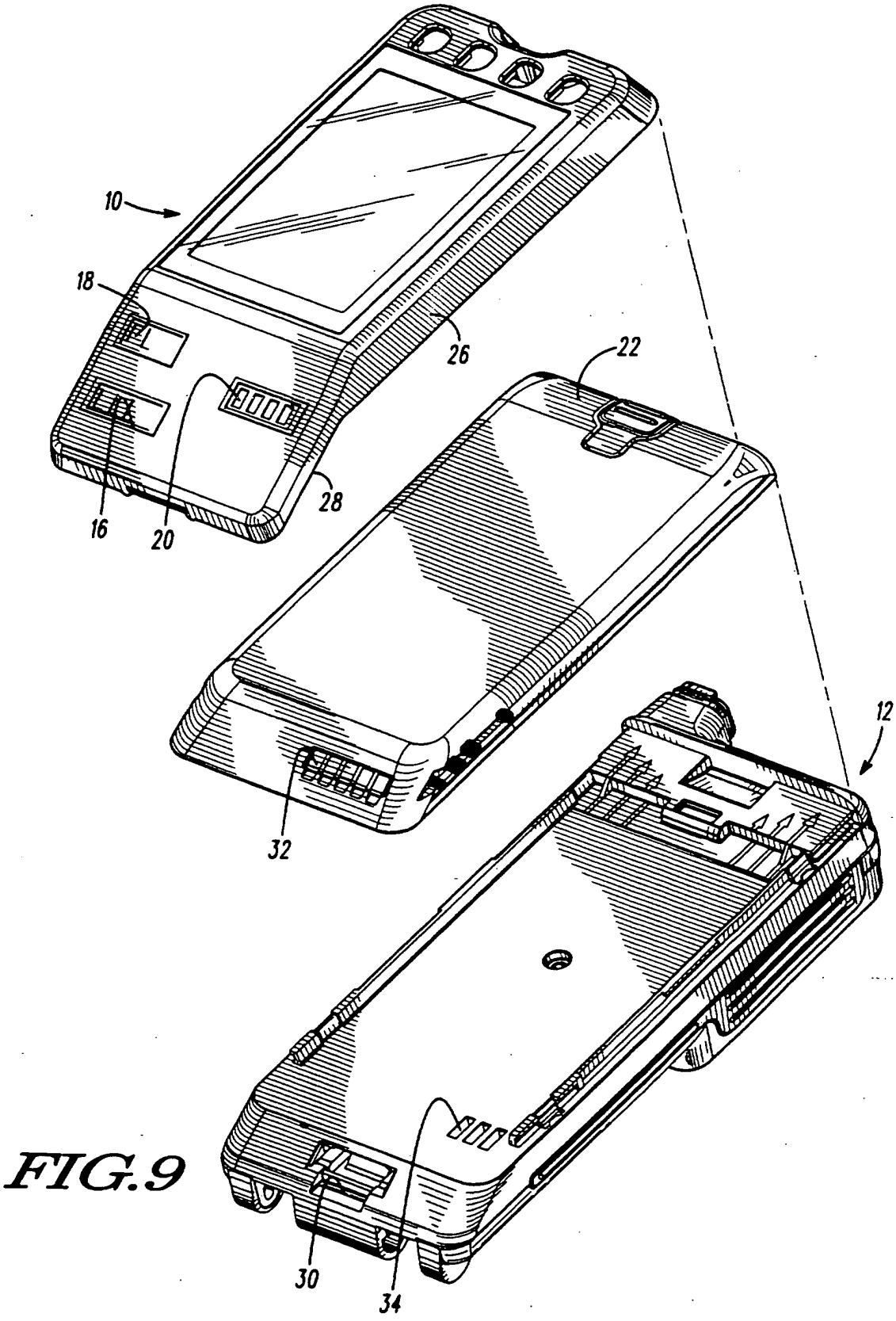


FIG.9

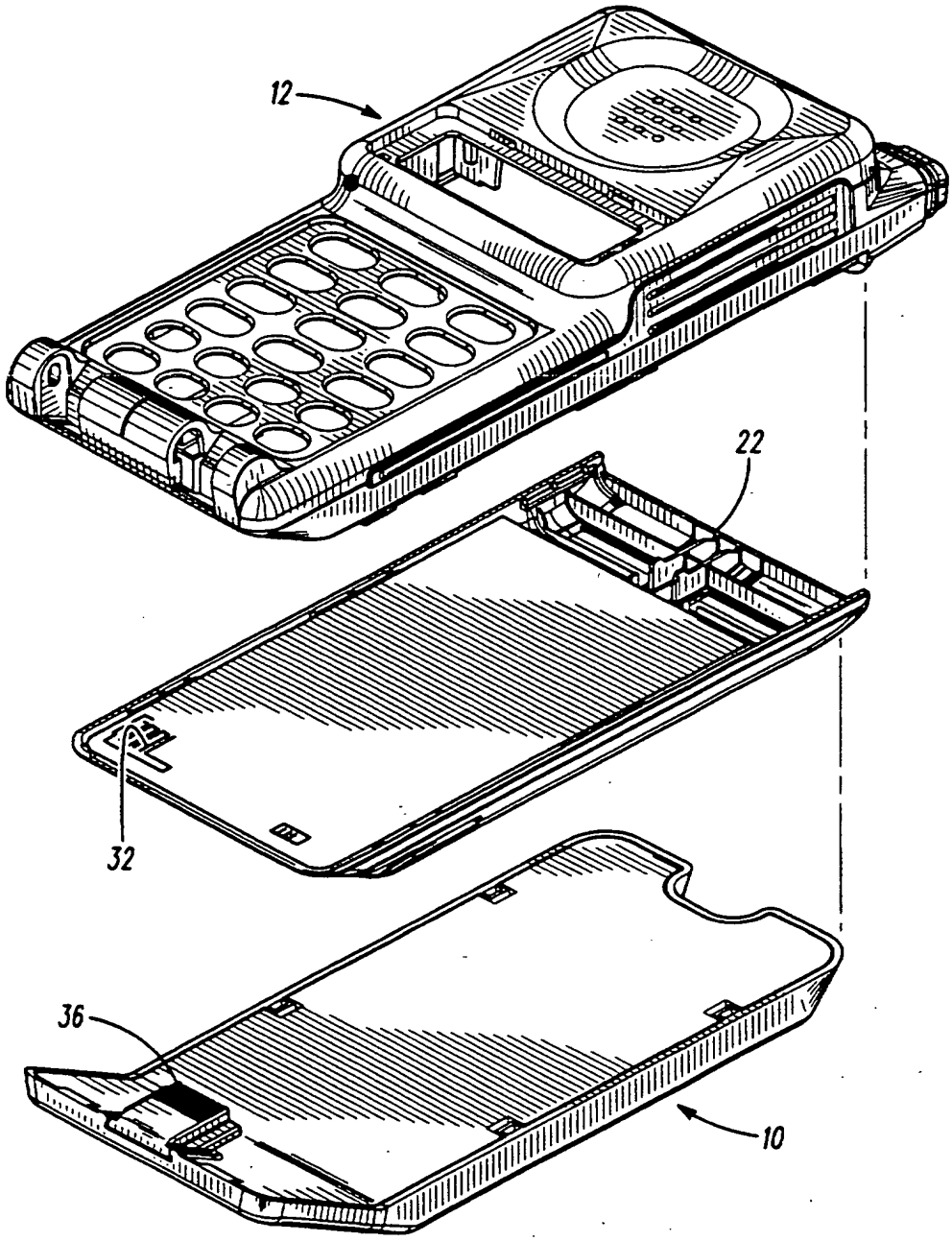


FIG. 10

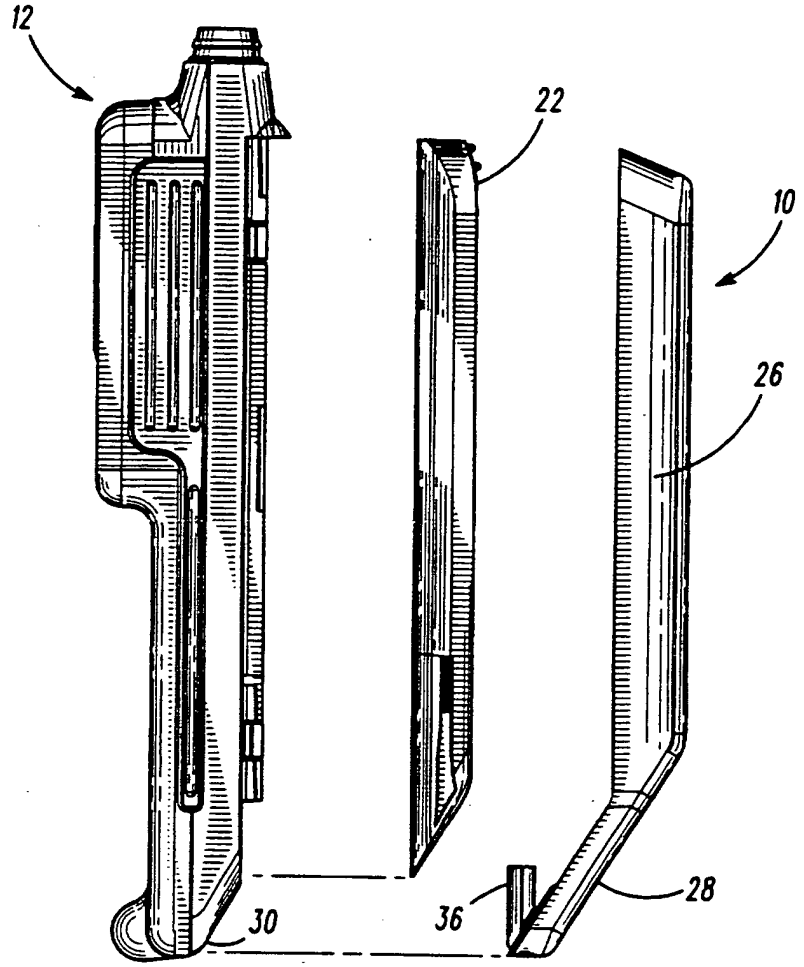


FIG. 11

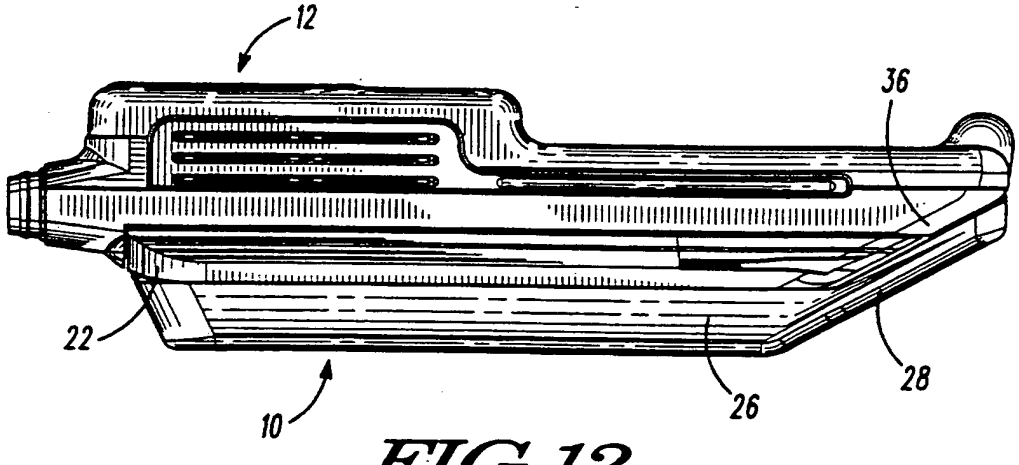


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/00813

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04B 1/38
US CL : 455/89, 90; 340/825.44; 379/58; 429/9
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/74, 89, 90, 344, 348, 349, 351; 340/825.44; 379/57-58; 429/9

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO, A, 91/12673(NGUYEN ET AL) 22 August 1991 (see figures 3 and 4B)	1-5 and 7
Y	JP, A, 63-224422 (YAMAUCHI ET AL) 19 September 1988 (see figure 1 and page 6, lines 2-9)	1-5, 7 and 11
Y	US, A 5,261,122 (OTSUKI ET AL) 09 November 1993 (see figure 1 and col. 1)	10-11
Y	US, A, 4,912,602 (ZUREK ET AL) 27 March 1990 (see figures 3 and 4)	5, 7, 11
Y	US, A, 5,265,158 (TATTARI) 23 November 1993 (see figurews 3 and 4)	12-20

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 MARCH 1996	09 APR 1996

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	ANDREW FAILE
Facsimile No. (703) 305-3230	Telephone No. (703) 305-4700

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/00813

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,317,247 (CHONG ET AL) 31 May 1994 (see figures 1-3)	13 and 19
Y, P	US, A, 5,446,783 (MAY) 29 August 1995 (see figures 2 and 3a)	16
Y, P	US, A, 5,465,401 (THOMPSON) 07 November 1995 (see figures 7 and 8)	15 and 18-19

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